Fastening pin

The object of the invention is the fastening pin, especially for fastening with floors, walls, or similar objects, by insertion it to prepared holes. This pin is particularly suitable for fixing threshold masking strips. Commonly known and applied pins for fastening in walls are mostly in two parts, where one part is made mainly with plastic and is expanded in hole by another detail, mostly by metal screw.

In many cases such solution is not satisfactory.

Also known is anchoring pin, e.g. as per polish patent specification No 176358, with details locking in hole by means of bonding mix, in which locking details are in a shape of ribs distributed round anchoring pin and on its side wall with maintained mutual distances in axial direction.

With announcement EP 0588734 it is known the threshold strip is in a shape of longitudinal profile, which comprise the guide of fastening nail head. Above mentioned guide has surface like V letter and it's longitudinal edge designates the rotation axis of the nail in guide. This is to allow in certain scope fastening of threshold strip onto foundation of differential height.

In solution by this invention there is proposed a pin which does not demand application of onerous setting mortar and simultaneously it will effectively fasten objects with wall.

The matter of the solution according to the invention is that the pin is provided with elastic protrusions, advantageously in a shape of convergent geometric figures which are

located around the core of the pin and external dimension of protrusions is larger than the hole dimension.

It is advantageous when protrusions are situated with an acute angle to pin's axis, towards it's head. Such arrangement of protrusions allow insertion of pin into hole and simultaneously effectively prevents it's draw out from the hole.

The proposed solution is such one in which protrusions are in a shape of truncated pyramids with rectangular base. Such form of protrusions includes many featheredges which find for them it's engagement in a hole.

There is also foreseen such solution in which appears diversification of protrusions cross-section area that means protrusions will be deflected during it's insertion into a hole under forces operation of different values. It is also allowed such solution where protrusions have unequal height and different height of protrusions may be realized both on the core circumference as also lengthwise it's axis. In a case of manufacturing pin with different cross-section and height it is advantageous that lower pins should have an larger cross-sectional area.

In alternate solution protrusions are made of different material than the pin's core material and protrusions may have a shape of rod, profitably made of steel. There is also possible such solution in which the pin's core is steel made and protrusions are made of plastic.

The substance of solution is also fastening pin, especially for threshold masking strips, having it's head located in channel on the bottom side of strip, and characterized in such a way that it contains a joint between anchored part and head.

Profitably, the joint has a form of mandrel cross-section narrowing and this narrowing has a shape of circumferential groove on the mandrel. In such a case profitably the pin's head has a shape of cylinder, because the narrowing allows bending of the pin in optional plane parallel to it's axis. The mandrel's cross-section area narrowing may be also in grooves form, profitably radial, perpendicular to the pin's axis and grooves may be mutually moved along the pin's axis.

The invention anticipates also a fastening pin in which the joint is in flat form having broken it's symmetry axis and profitably equipped onto it's bends with radial grooves forcing the pin's bend place.

There is also foreseen a pin in which the joint function is performed by such solution where the pin's section below it's head is made of material more flexible than the mandrel's material. The flexible material allows the mandrel's bending.

In another solution the joint is of the hinge form, in which the pin's head is equipped with protrusions of fork shape in which the pin's mandrel is rotationally mounted by a dowel.

The matter of sequent solution by the invention is based onto fact that the pin is equipped with elastic protrusions, profitably in a shape of convergent geometric figures, spaced round the pin's core and profitably situated under an acute angle towards it's head axis and these protrusions are situated onto ca. 2/3 of pin length from it's end but the pin's part near head is equipped with stabilizing fins of a trapezoid profile, what creates splines. It is profitable when fins are spaced symmetrical round the axis and having small convergence toward the pin's end as also when the pin's core is provided with joint between fins and head.

The solution as per invention allows also solid fastens of the pin in wall, without bonding means or details for pin's expansion in a hole. Elastic protrusions, bending under small force action, allow easy location of the pin into a hole without using tools for drive in, installing the pin into a hole and simultaneously locking it very effectively against it's removal and rotation in a hole. For the purpose to gain very strong connection may be used a setting material which will fill out spaces between protrusions and the hole's wall.

The solution by invention allows in a simply manner fastening of threshold masking strip onto floor ends in different heights and also eccentric connection of other parts.

The pin's equipment with fins causes that pin's protrusions are not exposed against transverse loads which are received by fins stabilizing pin in the hole's wall. The greater contact surface of the fin with the hole's wall in comparison with the elastic protrusions contact surface prevents against eventual chipping of the hole's periphery and allows transfer of larger transverse loads. The convergence of fins towards the pin's end allows it's insertion to the hole, and eliminates the hole's manufacturing failures, which is often battered during it's drilling in the foundation. Equipment of the pin with joint allows fastening of the floor's masking threshold strip on different heights as also eccentric connection of other details.

The subject of invention is showed by an example of performance on the drawing, in which fig. 1 presents the pin's view with protrusions, fig. 2 - enlarged detail of fig. 1, fig. 3 - pin embedded in hole and fastening strip masking floor's expansion gap, fig. 4 - perspective view of pin when head is of T letter profile, fig. 5 - end view of pin from fig. 1, fig. 6 - perspective view of pin with narrowing in form of radial, circumferential groove onto mandrel, fig. 7 - end view of pin from fig. 6, fig. 8 - perspective view of pin with joint of grooves shape, perpendicular to pin's axis, fig. 9 - end view of pin from fig. 8, fig. 10 - perspective view of pin with joint in shape of flat bar with

broken symmetry axis, fig. 11 - end view of pin from fig. 10, fig. 12 – perspective view of pin with hinge, fig. 13 - end view of pin from fig. 12, fig. 14 - perspective view of pin with hole, fig. 15 - end view of pin from fig. 14, fig. 16 - example of pin application for fastening threshold strip on floors end with different height, fig. 17 – view of pin with protrusions and fins in perspective view, fig. 18 - enlarged detail from fig. 17, fig. 19 - view of pin with head like T letter, fig. 20 - view of pin with head equipped with joint, and fig. 21 - presents pin embedded in hole, and fixing strip for expansion gap masking.

The pin 1 is equipped with elastic protrusions 2 in a shape of truncated pyramid with rectangular basis. Protrusions 2 are situated under an acute angle for pin's axis, towards it's head direction. Individual rows of protrusions are shifted each other along the pin's axis. During insertion of the pin into the hole 3 protrusions 2 are deflected towards the pin's axis. Resting on the hole's walls protrusions 2 prevent against it's draw out as also rotation round axis. The fastening pin equipped with head 4 and located in the threshold strip's channel 5 has the joint 6 situated between head 4 and mandrel 7. The joint 6 is in shape of radial narrowing 8 perpendicular to the pin's axis 1 (fig. 4 and fig.5).

In solution as per fig.6 and fig. 7 the narrowing has a form of groove 9 round the whole circumference of mandrel, and the head 4' has a form of cylinder. Such solution allows bending of the pin in optional plane parallel to it's axis.

Onto example of manufacturing presented by fig. 8 and fig. 9 the mandrel has two radial grooves 10. These grooves may be shifted each other along the pin axis.

As it is imaged by fig. 10 and fig. 11 the joint has form of broken flat bar 11 and on it's flexures has radial grooves 12 which constrain a place of pin's bending.

In solution presented by fig. 12 and fig. 13 the joint is in a shape of hinge. Between fork like protrusions 13 there is mandrel 7, rotationally mounted onto the dowel 14.

The joint function accomplish also solution presented by fig. 14 and fig.15 in which cross-section reduction, allowing pin's bending, is gained by the hole 15 in mandrel 7.

On fig. 17 is presented the pin equipped with elastic protrusions 2, made round it's axis onto ca. 2/3 of the core 7 length. Part of the pin near head 4 contains stabilizing fins 16, which have in end view almost trapezoid contour. Fins 16 are located symmetrical round the core 7, and its view remains splines. The fin's 16 convergence towards pin's end allows it's insertion into a hole and eliminates hole's manufacturing failures, that is often shattered during it's drilling in foundation.

Fig. 21 presents application of the pin for fastening floor's strip 5. After carry out the hole 17, the pin's head is placed in channel of the strip 5 and through the strip pins are forced

into holes. During such forcing elastic protrusions 2 are deflected towards head, and fins 16 stabilize pin's in the hole 17. The pin has narrowing 6, which accomplish the function of joint and in that way allows deflection of the pin's head when foundation is of different height.